# CITY OF PHILADELPHIA

**DEPARTMENT OF PUBLIC HEALTH**
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*Deputy Mayor for Health & Opportunity*
*Health Commissioner*

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*Director*

**Source Registration**
321 University Avenue, 2nd Floor
Philadelphia, PA 19104

Telephone (215) 685-7572
Fax (215) 685-7593

July 18, 2014

Charles Barksdale
Philadelphia Energy Solutions
Refining and Marketing LLC.
3144 Passyunk Avenue
Philadelphia PA. 19145

**PLID: 01501**

**RE:** Plan Approval 13260 - South Yard South Flare.

Dear Mr. Barksdale,

Air Management Services (AMS) has received and review the permit applications for the reactivation of South Yard South Flare. Attached is the plan approval along with its conditions.

If you have any questions, please contact me at 215-685-9427 or Biji.Pandisseril@phila.gov.

Sincerely,

Biji Pandisseril
Environmental Engineer

**CITY OF PHILADELPHIA**
**DEPARTMENT OF PUBLIC HEALTH**
**AIR MANAGEMENT SERVICES**

# PLAN APPROVAL

Plan Approval No.:13260 Date: July 18, 2014

**Plant ID: 01501**

| | | | |
|---|---|---|---|
| Owner: | PES Refining and Marketing | Source: | PES Philadelphia Refinery |
| Address: | 3144 Passyunk Ave<br>Philadelphia, PA 19145 | Location: | 3144 Passyunk Ave<br>Philadelphia, PA 19145 |

Attention: Charles Barksdale
215-339-2074

Pursuant to the provisions of Title 3 of the Philadelphia Code, the Air Management Code of February 17, 1995, as amended, and after due consideration of a plan approval application received under the rules and regulations of the Philadelphia Air Pollution Control Board, the City of Philadelphia Department of Public Health, Air Management Services (AMS) on January July 18, 2014 approved plans for the operation of the air contamination device(s) described below:

Reactivation of South Yard South Flare (P-643) (CD-112) with a dedicated IR camera to monitor the presence of a flare flame.

This Plan Approval expires on January 17, 2016. If reactivation has not been completed by this date, an application for either an extension or new plan approval must be made. The conditions of this plan approval will remain in effect until they are incorporated in an operating permit.

This Plan Approval is subject to conditions prescribed in the attachment.

7/18/14

Edward Wiener
Chief of Source Registration
(215)-685-9426

**PLAN APPROVAL CONDITIONS**
**PLAN APPROVAL NO. 13260**
**COMPANY: PHILADELPHIA ENERGY SOLUTIONS REFINING & MARKETING LLC.**

1. The South Yard South Flare shall be operated in accordance with the manufacturer's specifications and specifications in the application (as approved herein).

2. The South Yard South Flare shall comply will all applicable requirements set-forth in 40 CFR 60 Subpart A and J, 40 Subpart 63 Subpart A, and the Consent Decree.

*Work Practice:*

3. The Permittee shall not burn in flare any fuel gas that contains hydrogen sulfide ($H_2S$) in excess of 230 mg/dscm (0.10 gr/dscf) on rolling 3-hour period. The combustion in a flare of process upset gases or fuel gas that is released to the flare as a result of relief valve leakage or other emergency malfunctions is exempt [40 CFR 60.104(a)(1), 40 CFR 60.105(e)(3)(ii)]

4. The flare shall be designed for and operated with no visible emissions as determined by the methods specified in 40 CFR 60.18(f), except for periods not to exceed a total of 5 minutes during any 2 consecutive hours. [40 CFR 63.11(b)(4) and 40 CFR 60.18(c)(1)]

5. The flare shall be operated at all times when gases may be vented to them. The flare shall be operated with a minimum of a 98% Combustion Efficiency at all times when waste gases are vented to it. [40 CFR 63.643(a)(1), 40 CFR 63.11(b)(3), 40 CFR 60.18(e)]

6. The flares shall be operated with a pilot flame present at all times. [40 CFR 63.11(b)(5), 40 CFR 60.18(f)(2)]

7. The Permittee shall operate and maintain a flare gas recovery system to prevent continuous or routine combustion in the flare. [Consent Decree, Use of the flare gas recovery system obviates the need to continuously monitor emissions as otherwise required by 40 CFR 60.105(a)(4)]
   (a) Periodic maintenance shall be conducted for flare gas recovery systems.
   (b) All reasonable measures shall be taken to minimize emissions during the periodic maintenance on a flare gas recovery system is being performed.
   (c) The flare gas recovery system may be bypassed in the event of an emergency or in order to ensure safe operation of refinery processes.

8. The flare (steam-assisted flare) shall be used only when the net heating value of the gas being combusted is 11.2 MJ/scm (300 Btu/scf) or greater. The net heating value of the gas being combusted shall be determined by the methods specified in 40 CFR 60.18(f)(3). [40 CFR 60.18(c)(3)(ii)]

9. The flare (steam-assisted flare) may be designed and operated with an actual exit velocity less than Vmax and less than 122m/sec (400 ft/sec) [40 CFR 60.18(c)(4)(iii)]
   (a) Actual exit velocity shall be determined in accordance with 40 CFR 60.18(f)(4)
   (b) Vmax shall be determined in accordance with 40 CFR 60.18(f)(5)

10. The Permittee shall implement good air pollution control practices to minimize Hydrocarbon Flaring Incidents in accordance with the procedures in the Consent Decree.

*Testing Requirements:*

11. Within 60 days of start-up of the flare, the Permittee shall conduct performance test as follows:

(a) Test Method 22 in Appendix A of 40 CFR 60 shall be used to determine the compliance of flares with the visible emission limitations. The observation period is 2 hours and shall be used according to Method 22. [40 CFR 63.11(b)(4), 40 CFR 60.18(f)(1)]

(b) The net heating value of the gas being combusted in a flare shall be calculated using the following equation [40 CFR 60.18(f)(3)]:

$$H_T = K \sum_{i=1}^{n} C_i H_i$$

where:

$H_T$=Net heating value of the sample, MJ/scm; where the net enthalpy per mole of offgas is based on combustion at 25°C and 760 mm Hg, but the standard temperature for determining the volume corresponding to one mole is 20°C;

$C_i$=Concentration of sample component "i" in ppm on a wet basis, as measured for organics by Reference Method 18 and measured for hydrogen and carbon monoxide by ASTM D1946-77; and

$H_i$=Net heat of combustion of sample component i, kcal/g mole at 25°C and 760 mm Hg. The heats of combustion may be determined using ASTM D2382-76 if published values are not available or cannot be calculated.

(c) The actual exit velocity of a flare shall be determined by dividing the volumetric flowrate (in units of standard temperature and pressure), as determined by Reference Methods 2, 2A, 2C, or 2D as appropriate; by the unobstructed (free) cross sectional area of the flare tip. [40 CFR 60.18(f)(4)]

(i) In lieu of conducting the velocity test , the Permittee may submit velocity calculations which demonstrate that the Flare meets the performance specification required by 40 CFR 60.18

(d) The maximum permitted velocity, $V_{max}$, for flares complying with 40 CFR 60.18(c)(4)(iii)) shall be determined by the following equation: [40 CFR 60.18(f)(5)]

$$\text{Log10}\,(V_{max}) = (HT + 28.8)/31.7$$

where:

$V_{max}$=Maximum permitted velocity, M/sec

28.8 = Constant

31.7 = Constant

$H_T$=The net heating value as determined in 40 CFR 60.18 (f)(3).

*Monitoring and Recordkeeping Requirement:*

12. The Permittee shall monitor the fuel type and fuels usage of the fuel burned for each flare pilot on a daily basis.

(a) H2S in the refinery fuel gas fired at the pilot shall be monitored using a continuous monitor and recorder at the Point Breeze Fuel Gas Mix Drum, ~~except when burning fuel gas that is inherently low in sulfur content, such as natural gas~~

13. The Permittee shall monitor that the feed to the flares has not exceeded the worst case scenario used in the modeling demonstration. The Permittee shall determine SO2 emissions using the same analysis and calculations used in the modeling demonstration. [SO2 Operating Permit]

14. The presence of a flare pilot flame shall be continuously monitored using a thermocouple or any other equivalent device to detect the presence of a flame.[40 CFR 63.11(b)(5), 40 CFR 60.18(f)(2)]
    (a) The flare flame shall be monitored using an IR camera.

*Reporting Requirements:*

15. The Permittee shall follow the same investigation, reporting, and corrective action procedures as those set forth in Section V.K for Acid Gas Flaring Incidents of the Consent Decree. The results of this will be submitted with the Semi-Annual CD Report.

16. The Permittee shall submit an excess emission and continuous monitoring system performance report and/or a summary report to the EPA Administrator and AMS semiannually stating when and how long the pilot flame was not present. [40 CFR 63.10(e)(3)]

17. The Permittee shall submit CEM report for the H2S to Air Management Services on a quarterly basis. CEM reports must meet the requirements of the PA CSMM.

18. The Permittee shall submit all calculation used to comply with Condition 11.

19. All notifications required, as a result of any condition herein should be directed to

Chief of Source Registration
Air Management Services
321 University Avenue
Philadelphia, PA 19104

and all notifications required by the Consent Decree and NSPS Ja shall also be directed to EPA at:

Associate Director
Office of Enforcement and Compliance Assistance (3AP20)
U.S. EPA Region III
1650 Arch Street
Philadelphia, PA 19103-2029

***Future Requirements (no later than November 11, 2015):***

20. The flare shall comply with all applicable requirements of 40 CFR 60 Subpart Ja.

21. The Permittee shall not burn any fuel gas containing H2S in excess of 162 ppmv in the flare. The H2S content in the fuel gas shall be determined hourly on a 3-hour rolling average basis [40 CFR 60.103a(h) and 40 CFR 60.103a(f)]
    (a) The combustion in the flare of process upset gases or fuel gas that is released to the flare as the result of relief valve leakage or other emergency malfunctions is exempt from the above limit.

22. The Permittee shall develop and implement a written flare management plan **no later than the November 11, 2015** in accordance with 40 CFR 60.103a

23. The Permittee shall conduct a root cause analysis and a corrective action analysis for each of the following [Consent Decree and 40 CFR 103a(c)]
    (a) Any time the SO2 emission exceeds 227 kilograms (kg) (500 lbs) in any 24-hour period

(b) Any discharge to the flare in excess of 14,160 standard cubic meter (m3) (500,000 standard cubic feet (scf)) above the baseline, determined in 40 CFR 60.103a(a)(4)

24. The Permittee shall complete a root cause analysis and corrective action analysis as soon as possible, but no later than 45 days after a discharge meeting one of the conditions specified Condition 23. Special circumstances affecting the number of root cause analyses and/or corrective action analyses are as follows: [40 CFR 60.103a(d)]
    (a) If a single continuous discharge meets any of the conditions specified in Condition 23 for 2 or more consecutive 24-hour periods, a single root cause analysis and corrective action analysis may be conducted.
    (b) If a single discharge from a flare triggers a root cause analysis based on more than one of the conditions in Condition 23(a) - (b), a single root cause analysis and corrective action analysis may be conducted.
    (c) If the discharge from a flare is the result of a planned startup or shutdown of a refinery process unit or ancillary equipment connected to the affected flare and the procedures in 40 CFR 60.103a(a)(5) were followed, a root cause analysis and corrective action analysis is not required; however, the discharge must be recorded as described in §60.108a(c)(6) and reported as described in §60.108a(d)(5).
    (d) If both the primary and secondary flare in a cascaded flare system meet any of the conditions specified in 40 CFR 60.103a(c)(1)(i)-(iii) in the same 24-hour period, a single root cause analysis and corrective action analysis may be conducted.
    (e) Except as provided above in Condition 24(d), if discharges occur that meet any of the conditions specified in Condition 23(a) - (b) for more than one affected facility in the same 24-hour period, initial root cause analyses shall be conducted for each affected facility. If the initial root cause analyses indicate that the discharges have the same root cause(s), the initial root cause analyses can be recorded as a single root cause analysis and a single corrective action analysis may be conducted.

25. The Permittee shall implement the corrective action(s) identified in the corrective action analysis conducted pursuant to Condition 24 in accordance with the following applicable requirements: [40 CFR 60.103a(e)]
    (a) All corrective action(s) must be implemented within 45 days of the discharge for which the root cause and corrective action analyses were required or as soon thereafter as practicable. If the Permittee concludes that corrective action should not be conducted, the Permittee shall record and explain the basis for that conclusion no later than 45 days following the discharge as specified in 40 CFR §60.108a(c)(6)(ix).
    (b) For corrective actions that cannot be fully implemented within 45 days following the discharge for which the root cause and corrective action analyses were required, the owner or operator shall develop an implementation schedule to complete the corrective action(s) as soon as practicable.
    (c) No later than 45 days following the discharge for which a root cause and corrective action analyses were required, the Permittee shall record the corrective action(s) completed to date, and, for action(s) not already completed, a schedule for implementation, including proposed commencement and completion dates as specified in 40 CFR§60.108a(c)(6)(x).

26. The Permittee shall keep records of discharges greater than 500 lb $SO_2$ in any 24-hour period from the flare. Records shall be recorded no later than 45 days following the end of a discharge exceeding the thresholds. The records shall include information as required in 40 CFR 60.108a(c)(6). [Consent Decree and 40 CFR 60.108a(c)(6)]

27. The Permittee shall continuously monitor and record the H2S concentration for fuel gases being burned in the flare in accordance with 40 CFR 60.107a(a)(2).

28. The Permittee shall continuously monitor and record the flow rate of gas discharged to the flare. [40 CFR 60.107a(f)]

29. The total reduced sulfur concentration for each gas line directed to the flare shall be monitored in accordance with either paragraph 40 CFR 60.107a(e)(1), (e)(2) or (e)(3). [40 CFR 60.107a(e)]

30. The Permittee shall maintain a copy of the Flare Management Plan.[40 CFR 60.108a(c)(1)]

31. If the monitoring option in 40 CFR 60.107a(e)(2) is used, the Permittee shall keep records of the $H_2S$ and total sulfur analyses of each grab or integrated sample, the calculated daily total sulfur-to-$H_2S$ ratios, the calculated 10-day average total sulfur-to-$H_2S$ ratios and the 95-percent confidence intervals for each 10-day average total sulfur-to-$H_2S$ ratio. [40 CFR 60.108a(c)(7)]

32. The Permittee shall submit the flare management plan to AMS and EPA in accordance with 40 CFR 60.103a(b) no later than November 11, 2015.

33. The Permittee shall submit an excess emissions reports for all periods of excess emissions as defined in 40 CFR 60.107a(i)(2)(i) in accordance with 40 CFR 60.108a(d)

34. All notifications required in 40 CFR 60 Subpart Ja shall be submitted to the following address: [40 CFR60.103a(b)(3)]

U.S. Environmental Protection Agency,
Office of Air Quality Planning and Standards, Sector Policies and Programs Division,
U.S. EPA Mailroom (E143-01),
Attention: Refinery Sector Lead,
109 T.W. Alexander Drive,
Research Triangle Park, NC 27711.

Electronic copies in lieu of hard copies may also be submitted to refinerynsps@epa.gov.

cc: AMS Conformance file